



# Water Management Plan

United States Environmental  
Protection Agency  
Region 3  
Environmental Science Center  
701 Mapes Road  
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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 3  
ENVIRONMENTAL SCIENCE CENTER**

**WATER MANAGEMENT PLAN**

Approved by:

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## **1.0 EPA'S STATEMENT OF PRINCIPLES ON EFFICIENT WATER USE**

In order to meet the needs of existing and future populations and ensure that habitats and ecosystems are protected, the nation's water must be sustainable and renewable. Sound water resource management, which emphasizes careful, efficient use of water, is essential to achieve these objectives.

Efficient water use can have major environmental, public health, and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water resources. As we face increasing risks to ecosystems and their biological integrity, the inextricable link between water quality and water quantity becomes more important. Water efficiency is one way of addressing water quality and quantity goals. The efficient use of water can also prevent pollution by reducing wastewater flows, recycling process water, reclaiming wastewater, and using less energy.

EPA recognizes that regional, state, and local differences exist regarding water quality, quantity, and use. Differences in climate, geography, and local requirements influence the water efficiency programs applicable to specific facilities. Therefore, EPA is establishing facility specific Water Management Plans to promote the efficient use of water and meet the water conservation requirements under Executive Order 13123, Greening the Government Through Efficient Energy Management.

This Water Management Plan has been established to document and promote the efficient use of water at the U.S. EPA Environmental Science Center Laboratory in Fort Meade, Maryland. The plan is organized according to the Federal Energy Management Program (FEMP) Facility Water Management Planning Guidelines under Executive Order 13123.

## **2.0 FACILITY DESCRIPTION**

The Environmental Science Center (ESC) occupies an approximately 150,000 gross square foot building situated on approximately 24 acres at the U.S. Army's Fort George G. Meade. The facility is EPA owned and EPA operated, under a 25 year land use agreement granted by the Army in 1996. EPA has the option to renew the land use agreement for an additional 25 years. The facility includes 75 laboratories with 93 fumehoods and 10 Biological Safety Cabinets. EPA Region 3 occupants of the ESC include the Office of Analytical Services and Quality Assurance (OASQA), the Office of Enforcement, Compliance and Environmental Justice, the Office of Policy and Management and the Mid Atlantic Integrated Assessment Program. The EPA Headquarters Office of Prevention, Pesticides and Toxic Substances (OPPTS) also occupies a portion of the available space. Also housed in the facility is the Baltimore Resident Office for the Office of Enforcement and Compliance Assurance (OECA), Criminal Investigation Division, DC Government. ESC building operations and environmental compliance activities are managed by Region 3, Facilities Management and Services Branch on-site staff.

At the ESC, EPA scientists conduct tests on soil, air and water samples to determine the presence of pollutants and other contaminants. EPA microbiologists test drinking water to ensure its safety. Hospital disinfectants are tested to ensure the validity of their claims, and chemists develop the analytical methods necessary to monitor pesticide residues in food. ESC staff also inspect and investigate manufacturing facilities, hazardous waste sites, and public and private labs.

### 3.0 FACILITY WATER MANAGEMENT GOALS

The water management goals of the ESC are achieved through the implementation of the ESC's Environmental Management System. The Environmental Management System has been established and is implemented consistent with the ESC's environmental management policy. The ESC environmental management policy statement, and the Environmental Management System aspects and targets related to water management are provided in the following sections.

#### **Environmental Management Policy**

It is the Environmental Science Center's policy to integrate environmental stewardship into our operations. We will manage our organizations and our programs in a manner that protects the environment, the safety of our employees, and public health.

In support of this policy, the ESC organizations make the following pledge:

To comply fully with the letter and spirit of all Federal, State, and local environmental laws and regulations.

*We have persons specifically designated as the facility's manager; the facility safety, health and environmental manager; and the coordinator for the environmental management system. These staff will remain current and will assure compliance with applicable laws and regulations for the entire facility. We will assure that all appropriate staff members will remain current on all applicable laws and regulations.*

To consider environmental factors when making planning, purchasing, and operating decisions.

*We will adopt cost-effective practices that eliminate, minimize or mitigate environmental impacts and we will use environmentally preferred materials if those materials meet technical specifications.*

To work continuously to improve the effectiveness of our environmental management programs.

*We will establish appropriate environmental objectives and performance indicators to guide these efforts and measure our progress.*

To provide appropriate training and educate employees to be environmentally responsible on the job.

*We will use a variety of training and communication tools to educate our employees about this environmental management system and how to apply its policies and principles to our everyday work.*

To monitor our environmental performance regularly through rigorous evaluations.

*We will conduct annual environmental performance reviews with top management. We will conduct other environmental reviews periodically as suggested by the Environmental Management System Team.*

To seek to prevent pollution before it is produced, reduce the amount of waste at our facility, re-use and recycle whenever possible, and support pollution prevention by our customers and suppliers.

*We will participate in pollution prevention programs and develop related reports that can be shared within our facility and with others.*

To maintain and improve the grounds of the ESC in an environmentally sensitive manner including land, water, wildlife and natural resources.

*We will continue to use such concepts as beneficial landscaping as we seek to enhance our surroundings and manage our environment.*

To use energy efficiently throughout our operations, and support the efficient use of gas and electricity in our facility.

*We will use the building automation system to measure and manage our energy usage in the facility.*

To work cooperatively with the local community and other stakeholders to further common environmental objectives.

*We will participate in Fort Meade and other community environmental activities, seeking out ways to share our environmental stewardship message.*

To communicate and reinforce this policy throughout our organizations.

*We will develop communications strategies that are designed to ensure that employees and others who use our facilities have an appropriate understanding of the environmental management policy.*

*We will share our environmental management successes and progress with all organizations at the ESC.*

## **Environmental Management System Aspects and Targets**

The Environmental Science Center has established an Environmental Management System (EMS) with the following environmental aspects:

Air Emissions	Storm Water Discharge
Chemical Resources	Mobile Sources, Fuel
Electricity Consumption	Consumption/Emissions
Fuel Consumption	Waste Generation
Paper Consumption	Wastewater Discharge
Radiation	Water Consumption

Environmental Science Center EMS targets have been established for each of these aspects. The following aspects and targets explicitly address water use and discharge:

Aspect: Water Consumption

Targets:

- Establish a mechanism for the review of water consumption
- Correlate the consumption of water with the energy reduction program
- OASQA and OPPTS write Standard Operating Procedures or equivalent that specifies how to use equipment for minimal water consumption
- Maintain and promote awareness and involvement

Aspect: Storm Water Discharge

Targets:

- 100% compliance
- Maintain the operating condition of the storm water collection system
- Evaluate possible storm water management technologies and implement those with the best cost-benefit performance.

Aspect: Wastewater Discharge

Targets:

- 100% compliance
- Annually sample and test wastewater streams for pollutants



## **4.0 UTILITY INFORMATION**

### **Contact Information**

Water and sewer utilities are provided by:

Fort Meade Directorate of Public Works (DPW)

Operations Division  
ANME-PWO (5115)  
2212 Chisholm Ave.  
Fort George G. Meade, MD 20755-5115  
Attn: Joanne Navorow (310-677-9201)

### **Rate Schedule**

Water and sewer rates are variable, based on a calculation performed by Ft. Meade DPW. DPW calculates the total cost to provide water and sewer utilities to the base, and then prorates the cost among the tenant organizations. Most tenant organizations are billed based on occupied area; the ESC is one of the few tenants with meters. A consistent metered charge rate is still in the process of being established. Fees charged in FY2002 averaged \$0.0021/gallon.

### **Payment Office**

DFAS-ROME  
325 Brooks Road  
Rome, NY 13441-4527

## 5.0 FACILITY WATER USE INFORMATION

The ESC includes a mixed use of office and laboratory space. Laboratory activities are primarily analytical in nature and can require potable water or high purity de-ionized water for laboratory purposes. Water is also used as cooling tower make-up water, boiler feed water, and for sanitary requirements. The facility uses natural landscaping; therefore, virtually no water is used for landscape irrigation.

### Major Water Using Processes

Average water use in FY 2002 by major process is shown in Table 1.

**Table 1**  
**Major Water Using Processes**

Major Process	Annual Consumption (gallons)	Percent of Total	Comments
Cooling tower make-up	3,213,201	47.9	Metered
Boiler feed water	559,501	8.4	Metered
Reverse osmosis excess production and reject stream	1,800,000	26.9	Estimated from use pattern and equipment specification
Sanitary	530,000	7.9	Engineering estimate
Laboratory process and other uses	596,000	8.9	By difference
TOTAL	6,699,000	100.0	Metered

Because a large component of total water use is for cooling tower consumption, water use varies seasonally. Charts showing this water use trend between 1999 and 2002 are provided in Appendix A.

### Measurement Devices

Flow totalizing water meters are installed on the water main that supplies all water to the facility, on the water line that supplies cooling tower make-up water, and on the water line that supplies boiler feed water. Total water use and cooling tower make-up flow is recorded weekly, and tracked for consumption trends.

**Shut-off Valves**

Building water supply shut off valves are located in the basement. The water inlet skid is to the left corner after passing the central plant office. The entire building water supply valve is located in the grassy area to the right of the entrance-way across from the facility flag pole.

**Occupancy and Operating Schedules**

Approximately 165 employees work at the ESC. The ESC operates on a flex time schedule and is typically occupied between 6:00 a.m. and 6:30 p.m., Monday through Friday.

## **6.0 BEST MANAGEMENT PRACTICE SUMMARY AND STATUS**

The Federal Energy Management Program (FEMP) has identified Water Efficiency Improvement Best Management Practices (BMPs) in ten possible areas. Implementation of BMPs in four or more areas is required under FEMP guidance. The ESC has adopted and will maintain BMPs in eight of the ten areas:

- ✓ Public Information and Education Programs
- ✓ Distribution System Audits, Leak Detection and Repair
- ✓ Water Efficient Landscape
- ✓ Toilets and Urinals
- ✓ Faucets and Showerheads
- ✓ Boiler/Steam Systems
- ✓ Single-Pass Cooling Systems
- ✓ Cooling Tower Systems
- ☐ Miscellaneous High Water-Using Processes
- ☐ Water Reuse and Recycling

### **Public Information and Education Programs (BMP #1)**

Water consumption, storm water discharge, and wastewater discharge targets have been established under the facility Environmental Management System. These targets are communicated to employees through training, fact sheets, and bulletin board postings. An annual report on water consumption is generated and posted for employee review. During drought conditions, periodic e-mails are sent to on-site staff reminding them of the importance of water conservation measures. ESC initiatives to conserve water are also featured in EPA wide newsletters, such as *Energizing EPA*.

### **Distribution System Audits, Leak Detection and Repair (BMP #2)**

A screening level system audit was conducted in October 2002 and known water uses account for greater than 90% of water consumption.

Facility staff are trained to report leaks and malfunctioning water using equipment to a facility maintenance help line. Reported problems are assigned a work order, which is completed by the facility operation and maintenance contractor. Each work order is tracked to completion, including a survey of the person who reported the problem to verify they are satisfied with the corrective action.

### **Water Efficient Landscaping (BMP #3)**

Native trees and shrubs were used in facility landscaping so that an irrigation system is not required. Grassy areas are mown and allowed to brown out during dry periods. Drip irrigation bags are used in spot applications to provide supplemental water to plants in distress.

#### **Toilets and Urinals (BMP #4)**

Low-flow, 1.6 gallons per flush toilets and 1.0 gallons per flush urinals are used throughout the facility.

Leaking or malfunctioning toilets and urinals are reported to the facility maintenance help line. Reported problems are assigned a work order, which is completed by the facility operation and maintenance contractor. Each work order is tracked to completion, including a survey of the person who reported the problem to verify they are satisfied with the corrective action.

#### **Faucets and Showerheads (BMP #5)**

Low-flow, maximum 2.0 gallons per minute faucets and maximum 2.5 gallons per minute showerheads are used throughout the facility. System pressure is maintained between 20 to 80 pounds per square inch.

Leaking or malfunctioning faucets and showerheads are reported to the facility maintenance help line. Reported problems are assigned a work order, which is completed by the facility operation and maintenance contractor. Each work order is tracked to completion, including a survey of the person who reported the problem to verify they are satisfied with the corrective action.

#### **Boiler/Steam System (BMP #6)**

The boiler water system is monitored and maintained two times per month under a service contract to prevent system corrosion and optimize condensate reuse. Boiler water quality parameters such as hardness, pH, conductivity, alkalinity,  $\text{SO}_3$ , and  $\text{PO}_4$  are monitored and controlled through periodic testing and chemical treatment provided by a service contractor. Approximately 80% of steam condensate is captured and returned to the boiler system.

#### **Single-Pass Cooling Systems (BMP #7)**

Use of single-pass cooling has been eliminated from laboratory processes. Point of use, closed-loop chillers are used in individual laboratories where water cooling is required.

#### **Cooling Tower Systems (BMP #8)**

Cooling tower make-up water is metered and consumption trends are tracked weekly. Unusual consumption trends are investigated and resolved. Cooling tower consumption is subtracted from total water use when sewer use charges are calculated.

A cooling tower system quality and performance review is conducted two times per month by a cooling tower maintenance contractor. A conductivity meter is used to automatically control cooling tower blow down; the conductivity meter is regularly maintained by the cooling tower maintenance contractor. The blow down controller is set to achieve seven cycles of concentration within the cooling tower. Chemical treatment is provided to control scale and corrosion.

## **Miscellaneous High Water-Using Processes**

Approximately one quarter of facility water consumption is related to generation of de-ionized (DI) water for laboratory use. The DI water is generated through a multi-step process consisting of multimedia filtration, water softening, carbon adsorption, and reverse osmosis (RO). Treated water from the RO unit is used as feed water to the DI water recirculating loop. The DI water is circulated through an ion exchange bed, ultraviolet disinfection unit, and ultra filtration unit.

Presently, the RO unit runs for most of the day, even when there is no demand for RO water in the DI water loop. This method of operation has been established to avoid deterioration in RO unit performance and water quality that could occur if the RO unit sits idle. However, a significant portion of the RO unit production goes unused and is sewerred. ESC is working toward optimizing RO unit performance, and establishing BMPs in this area.

## **7.0 DROUGHT CONTINGENCY PLAN**

The ESC will follow the water use recommendations and requirements of the Maryland Department of the Environment, which coordinates the drought response within the State of Maryland. General information on drought conditions and information on associated water use restrictions are posted at the Maryland drought information web page:

<http://www.mde.state.md.us/Water/Drought/index.asp>

As matter of general operating practice, the ESC already follows most of the water conservation approaches that could be required under drought conditions. Water is not used for irrigation, decorative fountains, maintenance of paved surfaces, or washing of mobile equipment.

In the event that voluntary or mandatory water consumption reductions are instituted by Maryland Department of the Environment, the ESC will form a task force of facility and operating personnel to identify and implement modifications to facility operations to achieve additional specified reductions in water consumption.

## **8.0                   COMPREHENSIVE PLANNING**

Water supply, wastewater generation, storm water management, and water efficiency best management practices will be taken into account during the initial stages of planning and design for any facility renovations or new construction. These factors will also be considered prior to the purchase and installation of any equipment that would measurably change facility water consumption.



## **9.0 OPPORTUNITIES FOR FURTHER WATER CONSERVATION**

ESC is pursuing two projects to achieve additional reductions in water use:

**1) RO Monitoring Project.** The RO unit operating schedule and control system will be optimized to reduce excess RO water and associated reject water discharged to sewer. Daily system run time will be turned down to reduce excess generation of RO water, while the RO water consumption rate and quality are monitored to ensure no negative effects on system performance. As part of this process optimization, hardware and software needed to connect the RO unit to the building automation system will be specified, and acquired if found to offer cost effective system improvement.

**2) Cooling Tower and Boiler Water Control Project.** The cooling tower and boiler water quality control system will be updated with a networked Aquatrac control system supplied by GE Betz. The updated control system will save water and energy by providing more consistent and accurate control over the cooling tower and boiler water blowdown, and associated chemical feed systems.

**APPENDIX A**  
**WATER USE TREND DATA FOR 1999 TO 2002**